

### **REMARKS**

Claims 88-91 are canceled. Claims 14-15, 29, 47, 63, 77 and 84 are amended to correct typographical or grammatical errors or to otherwise improve the readability of the claims. It is noted that claim 84 is amended to depend from claim 80 rather than claim 83. No new matter is added. It is submitted that the amendments are minor in nature and are not related to patentability and/or are non-narrowing, as the Examiner can ascertain from inspection of the amendments. Now in the case are claims 1-87 and 92-96, of which claims 1, 34, 69, 92 and 95 are independent. Now pending claims 1-33 and 92-96 are allowed and pending claims 34-87 stand rejected.

### **Allowed Claims**

It is noted with appreciation that claims 1-32 and 92-96 are now allowed. However, regarding the reasons for allowance provided on pages 5-6 of the outstanding Non-Final Office Action, Applicants' Attorney notes that some clarification may be in order. The Examiner's reasoning regarding allowance references pages 21-22 of the Applicants' Amendment in Response to Notice of Non-Compliant Amendment, which was mailed November 19, 2006 with the above-mentioned RCE. Applicants do indeed note on pages 21-22 of the foregoing that according to the recitation of claim 1 the resonance wavelength of the second cavity is at least a function of the resonance wavelength of the first cavity. According to the Examiner's analysis, this "claimed relationship," taken in conjunction with the rest of the claimed structure of claim 1, distinguished over the art of record. However, it was merely further pointed out by way of technological background by Applicants on pages 21-22 that "[o]ne instance wherein the resonance wavelength of the second cavity is a function of at least the resonance wavelength of the first cavity is where energy having the resonance wavelength of the first cavity pumps the second cavity." However, this aside is clearly not part of the "claimed relationship" of the independent allowed claims, as no such language appears in those claims, and allowance of the claims is understood to be made only on the basis of the recitations of the claims. If the Examiner disagrees with the foregoing, Applicants respectfully request that clarification of the Examiner's reasons for allowance be provided with the next office action. Otherwise, Applicants do not wish to burden the Examiner with preparing a clarification.

## **Claim Rejections**

### **Claims 34-68**

Claim 34 is independent, and claims 35-68 depend, directly or indirectly, from claim 34. Claims 34-64 and 66-68 are rejected as unpatentable under 35 U.S.C. § 103 in view of U.S. Patent No. 6,407,855 B1 (“MacCormack”). Claim 65 is rejected under 35 USC § 103 over MacCormack in further in view of Dianov et al., “Three-cascaded 1407-nm Raman laser based on phosphorus-doped silica fiber”, Optics Letters, Mar. 15, 2000 (“Dianov”).

The Office Action elaborates on the rejections of claims 34-68 (as well as of claims 69-91) on pages 6 and 7, and Applicants respond to that elaboration below. However, on pages 3-4 and the top of page 5, the Non-Final Office Action presents argument, though perhaps intended to address claims 34-64, 66-71 and 85-91, that reads as directed to the now allowed claims 1-32, including paragraphs on page 4 that specifically address, as if rejecting, now allowed claims 13 and 21-23. Applicants assume that the foregoing pages include information mistakenly imported from an earlier Office Action (especially as it appears word for word to be the same as that earlier presented in the Final Office Action dated 9/16/2005) in the rejection of claims 1-32), and point out the mistake at least in part so as to avoid there being any doubt as to the allowability of now allowed claims 1-32. Again, no reply is necessary if the Examiner is in agreement that there is no confusion as to the allowance of claims 1-32.

As noted in the Amendment in Response to Notice of Non-Compliant Amendment filed November 19, 2006, Applicants do not concede that MacCormack is properly prior art to the Applicants’ claimed inventions. The Applicants reserve the right to establish an invention date for the claimed inventions that is on or before October 29, 1999, which is the effective §102(e) date of MacCormack apparently relied on by the Patent Office.

Applicants’ Attorney does not disagree with the Examiner’s contention, stated on page 4 of the outstanding Non-Final Office Action (as well as stated in earlier office actions) that known prior art Raman fiber lasers can use three or more pairs of reflective gratings. MacCormack itself indicates as much. The conventional approach is understood to be the Cascaded Raman Resonator (CRR) configuration, described in detail at column 5, lines 6-19 of MacCormack, discussing Figure 1 thereof, as follows:

The CRR [Cascaded Raman Resonator] is known in the art, and uses a Raman amplification medium that is surrounded on both sides by matched pairs of wavelength selective reflectors. Each of the reflector pairs is tuned to a wavelength corresponding to one of the Stokes orders relative to the original pumping wavelength. For example, stimulated Raman scattering (SRS) results in optical energy at the original pumping wavelength being converted to optical energy at a higher wavelength corresponding to the first Stokes order relative to the original wavelength. Reflectors are provided that resonate the optical energy of the first Stokes order, and further SRS causes the generation of optical energy at a second Stokes order. A second set of reflectors is tuned to the wavelength of this second Stokes order, and the process continues.

However, the invention as recited in claim 34 of Applicants' pending patent application recites:

at least three pairs of reflectors disposed in the optical fiber, each pair of reflectors forming a corresponding resonance cavity with a corresponding resonance frequency, the resonance frequency of each resonance cavity being different than the resonance frequency of any other cavity, *wherein the optical fiber substantially devoid of a location that is included in more than two of the resonance cavities.*

Clearly, the conventional CRR approach does not meet the claim recitation that the fiber be "substantially devoid of a location that is included in more than two of the resonance cavities." With reference to Figure 1 of MacCormack, grating pairs 12-12, 14-14, 16-16 and 18-18, along with grating pairs 20A-20B, 22A-22B and 24A-24B, are understood to be arranged in a CRR configuration. The coil of fiber 11 of Figure 1 of MacCormack clearly includes a location that is included in *all seven* resonance cavities, namely, all of resonance cavities 12-12, 14-14, 16-16, and 18-18, as well as resonance cavities 20A-20B, 22A-22B and 24A-24B.

However, the outstanding Non-Final Office Action, in its rejection of claim 34, focuses on Figure 4 of MacCormack. On pages 6-7 of the outstanding Non-Final Office Action, the Examiner considers that Figure 4 of MacCormack, as is proposed to be modified in the Non-Final Office Action, meets all of the limitations of independent claim 34, including the recitation that the fiber be "substantially devoid of a location that is included in more than two of the resonance cavities." The Examiner asserts that Figure 4 of MacCormack

explicitly and unequivocally discloses optical fiber that is substantially devoid of a location that is included in more than two of the resonance cavities, as claimed in claim 34. That is because grating elements "42A" and "42B" forms one resonance cavity and grating elements "44A" and "44B" forms another resonance cavity (see also column 8,

lines 42-58). Therefore the MacCormack reference, as it is proposed to be modified in the office action, fully meet all the claimed limitations of independent claim 34.

The outstanding Non-Final Office Action appears to contend that because Figure 4 of MacCormack is “substantially devoid of a location that is included in more than two of the resonance cavities” that accordingly adding another pair of gratings simply creates a structure that meets all limitations of claim 34. However, Figure 4 (or any other structure that includes *only* two pairs of gratings) cannot be other than “substantially devoid of a location that is included in more than two of the resonance cavities” *because it only has two resonance cavities*, namely, those formed by gratings pair 42A and 42B and pair 44A and 44B.

Assuming, only for the purposes of argument herein, that one of ordinary skill in the art would be motivated to add a third pair of gratings to Figure 4 (and that other limitations of claim 34 could be met), such motivation does not establish that claim 34 is obvious. The reasoning of the outstanding Non-Final Office Action is flawed in that it treats the limitation that the fiber be “substantially devoid of a location that is included in more than two of the resonance cavities” as if it is met by Figure 4 *independently* of the adding of a third pair of gratings, and as if simply adding the third pair of gratings would necessarily result in a structure that meets the limitations of claim 34. The limitation is not met independently, because *how* the additional pair of gratings is added is critical to whether or not the limitation “substantially devoid of a location that is included in more than two of the resonance cavities” is met after Figure 4 of MacCormack is modified. It is clearly possible that one can add a third pair of gratings to Figure 4 in a manner that does not meet the limitation that the fiber be “substantially devoid of a location that is included in more than two of the resonance cavities.”

In this regard it is respectfully submitted that the outstanding Non-Final Office Action has not properly considered the MacCormack reference *as a whole*. See MPEP § 2141.02: “[a]scertaining the differences between the prior art and the claims at issue requires interpreting the claim language, and considering both the invention and the prior art references as a whole.” The prior art is specifically addressed in subsection VI of MPEP § 2141.02, which is entitled “PRIOR ART MUST BE CONSIDERED IN ITS ENTIRETY, INCLUDING DISCLOSURES THAT TEACH AWAY FROM THE CLAIMS” and which further emphasizes that “[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention.” (emphasis in original).

It is respectfully submitted that the teaching of MacCormack to add more gratings pairs to the apparatus of Figure 4 thereof must be taken into account. See, for example, Figure 5 of MacCormack, which is described at column 9, lines 4-29. Figure 5 modifies Figure 4 by adding more gratings pairs, in the form of a modified CRR configuration, to Figure 4. In Figure 5 all of the cavities formed by gratings pairs represented by reference numerals 12, 14, 16, 18 and 20A/B overlap all of the cavities represented by gratings pairs 13, 15, 17, 19 and 21A/B. Figure 5 shows three gain media (46, 48, 50). The claim recitation of claim 34 that the fiber be “substantially devoid of a location that is included in more than two of the resonance cavities” is clearly not met – all locations on fiber gain media 46 or fiber gain media 50 are between no fewer than *five* resonance cavities, and all locations on fiber gain 48 are between no fewer than *ten* resonance cavities.

Thus, in considering the invention as recited in claim 34 and the prior art as a whole, especially the teaching of MacCormack away from the invention as recited in claim 34, it is respectfully submitted that MacCormack does not render claim 34 obvious. MacCormack does not teach or suggest an optical fiber as recited in claim 34 where the fiber “is substantially devoid of a location that is included in more than two of the resonance cavities.” Furthermore the Patent Office has not pointed to any teaching or suggestion that would lead one of ordinary skill in the art to deviate from the teachings of MacCormack, such as the teachings of Figure 5 thereof. Applicants thus respectfully submit that MacCormack is distinguishable at least on this basis and request that the rejection be withdrawn.

To establish a prima facie case of obviousness, which Applicants submit is not established, the Patent Office must provide some reason to modify Figure 4 of MacCormack so as to meet the limitation of claim 34. Recent holdings regarding the obviousness determination, namely, *KSR v. Teleflex*, 550 U.S. \_\_\_\_ (2007), as well *Ex parte Smith*, \_\_ Westlaw \_\_ (PTO Bd. App. & Int. June 25, 2007) and *Ex parte Catan*, \_\_ Westlaw \_\_ (PTO Bd. App. & Int. July 3, 2007) reiterate that “rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”. See *Ex Parte Catan* at page 11, *Ex Parte Smith* at page 14. The Office Action’s analysis of claim 34 is not a case of “a mere substitution of one element for another known in the field”, where “the combination must do more than yield a predictable result”, such as, for example, the substitution of a bioauthentication device, such as a

fingerprint reader, for a PIN input device, to enable use of a computer program. See, for example, *Ex Parte Catan*, page 11, citing *KSR v Teleflex*. Here, the Examiner is proposing that additional elements be added to Figure 4 of MacCormack, which elements must be added in a very particular way to meet the claim limitation, and no articulated reasoning has been provided for how and why the components would be added so as to meet the claim limitation

*“substantially devoid of a location that is included in more than two of the resonance cavities.”*

The requirement for “some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness” is especially important here where primary reference relied upon by the Examiner, namely, MacCormack, does in fact explicitly teach modifying Figure 4 to include additional pairs of gratings, and does so in the conventional manner of adding multiple pairs of nested gratings, the CRR configuration, such that the foregoing limitation of claim 34 is clearly not met.

If the Examiner persists in the rejection of claim 34, the Applicants respectfully request that the Examiner provide the necessary articulated reasoning, including using either words and/or providing a drawing to show where the third pair of gratings would be located in Figure 4 and why he considers one of ordinary skill would be motivated to modify Figure 4 to include the so located third pair of gratings, such as by describing what function the gratings would perform in improving the apparatus of Figure 4. However, it is respectfully submitted that such an exercise is not necessary, as the foregoing clearly demonstrates that claim 34 is not rendered obvious by MacCormack.

As each and every limitation of a claim, such as claim 34, must be taught by the prior art to render the claim unpatentable, Applicants need only demonstrate that the prior art fails to teach a single limitation. No admission is made that Applicants agree with contentions of the outstanding Non-Final Office Action not discussed and disputed herein or that other limitations of claim 34 as to which the outstanding Non-Final Office Action may be silent are met by the prior art.

Regarding claims 35-68, which depend from claim 34, because each limitation of claim 34 has not been shown by the Patent Office to have been taught or suggested in MacCormack, dependent claims 35-68 are believed to be patentable over MacCormack for at least the reasons given above. *Dianov*, relied upon in the rejection of claim 65, does not cure the above noted defect of MacCormack. As above, no admission is made that Applicants agree with contentions

of the Non-Final Office Action relating to the dependent claims not discussed and disputed herein or that other limitations of the dependent claims as to which the Non-Final Office Action may be silent are met by the prior art.

#### Claims 69-87

Claims 70-87 all depend from claim 69. Claims 69-71 and 85-87 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over MacCormack. Claims 72-84 stand rejected under 35 U.S.C. § 103(a) over MacCormack in view of Dianov. The basis for the present rejection is essentially the same as that stated above for independent claim 34. As with claim 34, discussed above, claim 69 and its dependent claims require that the optical fiber be substantially devoid of a location that is included in more than two of the resonance cavities. For at least the same reasons as discussed above with respect to claim 34, Applicants submit that MacCormack does not anticipate or render obvious claim 69, and request that the objection be withdrawn.

Because each limitation has not been shown by the Patent Office to have been taught or suggested in MacCormack, claim 69 is believed to be patentable for at least the reasons given above. While the Applicants do not concede that MacCormack or Dianov teaches the further limitations of claims 70-87, Applicants note that these claims depend from claim 69 and, thus, are patentable over MacCormack, either alone or in combination with Dianov, for at least the reasons discussed above with regard to claim 69. As above, no admission is made that Applicants agree with contentions of the Non-Final Office Action not discussed and disputed herein or that other limitations of the claims as to which the Non-Final Office Action may be silent are met by the prior art.

#### Claims 88-91

Claims 88-91 are canceled to expedite prosecution. No admission is made as to the propriety of the rejections of claims 88-91 and Applicants reserve all rights regarding filing a continuation application including claims reciting the invention as claimed in claims 88-91.

#### Electronic Payment of Fees

Fees associated with this filing (Three Month Extension of Time fee of \$510 for a Small Entity), are being paid electronically. No other fees are considered to be due. However, if it is

determined that an additional fee is due, or that an overpayment has been made, please debit or credit, as appropriate, Deposit Order Account 502343.

**Request for Telephonic Interview**

A telephonic interview is respectfully requested should the Examiner not consider all the pending claims to be allowable. The undersigned can be contacted at the coordinates below regarding setting up a time and date for the telephonic interview.

**CONCLUSION**

This Response to Non-Final Office Action is considered to address all matters raised by the Examiner in the outstanding Non-Final Office Action bearing a Notification Date of 02/02/2007. Applicants believe the pending application is now in condition for allowance. Reconsideration is respectfully requested of all outstanding issues, and, as noted above, a telephonic interview is respectfully requested should the Examiner deem that any of the pending claims are not allowable.

Please do not hesitate to contact the undersigned if any issues at all are deemed to remain unresolved.

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Respectfully submitted,

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